

WHAT IS CLAIMED IS:

1. A light emitting panel assembly comprising a light emitting panel member having at least one input edge for receiving light from at least one light source, and a pattern of individual light extracting deformities on or in at least one panel surface of the panel member for producing a desired light output from the panel member, each of the deformities having a length and width substantially smaller than the length and width of the panel surface and also having a well defined shape, at least some of the deformities having at least two surfaces that intersect each other to form a ridge and intersect the panel surface or another deformity.

2. The assembly of claim 1 wherein at least one of the two surfaces of the deformities is curved and intersects the panel surface.

3. The assembly of claim 2 wherein the other of the two surfaces of the deformities is planar.

4. The assembly of claim 1 wherein at least the two surfaces of the deformities are curved.

5. The assembly of claim 1 wherein at least the two surfaces of the deformities intersect the panel surface.

6. The assembly of claim 5 wherein at least one of the two surfaces of the deformities also intersects another deformity.

7. The assembly of claim 1 wherein the areas of at least the two surfaces of the deformities have a different size and shape.

8. The assembly of claim 1 wherein the areas of at least the two surfaces of the deformities are of the same size and shape.

9. The assembly of claim 1 wherein the at least one light source is optically coupled to only a portion of the width of the input edge, and one of the surfaces of at least some of the deformities at different locations across the width of the panel surface is a sloping surface that is angled at different angles depending on the location of the deformities across the width of the panel surface to face the portion of the input edge to which the light source is optically coupled.

10. The assembly of claim 9 wherein at least some of the deformities are arranged in a radial pattern across the width and length of the panel surface with the sloping surface of the deformities in radial alignment with the portion of the input edge to which the light source is optically coupled.

11. The assembly of claim 9 wherein the deformities are arranged in a random pattern on or in the panel surface.

12. The assembly of claim 9 wherein the light source is a light emitting diode.

13. The assembly of claim 9 wherein the sloping surface of at least some of the deformities is curved.

14. The assembly of claim 9 wherein the sloping surface of at least some of the deformities is planar.

15. The assembly of claim 9 wherein a plurality of light sources are optically coupled to different portions of the width of the input edge, and the sloping surface of different ones of the deformities at different locations across the width of the panel surface are angled at different angles to face different portions of the input edge to which the different light sources are optically coupled.

16. The assembly of claim 15 wherein at least some of the deformities are arranged in a radial pattern across the width and length of the panel surface with the sloping surface of the deformities in radial alignment with different portions of the input edge to which the different light sources are optically coupled.

17. The assembly of claim 15 wherein the deformities are arranged in a random pattern on or in the panel surface.

18. The assembly of claim 15 wherein the light sources are light emitting diodes.

19. The assembly of claim 15 wherein the sloping surface of at least some of the deformities is curved.

20. The assembly of claim 15 wherein the sloping surface of at least some of the deformities is planar.

21. The assembly of claim 1 wherein at least some of the deformities only have the two surfaces.

22. The assembly of claim 21 wherein one of the surfaces is curved and the other surface is planar.

23. The assembly of claim 21 wherein both of the surfaces are curved.

24. The assembly of claim 1 wherein the surfaces of at least some of the deformities comprise at least one side wall and at least one end wall that is rounded, curved or conically shaped.

25. The assembly of claim 24 wherein at least some of the deformities only have one side wall, the side wall being curved.

26. The assembly of claim 1 wherein at least some of the deformities have two rounded, curved or conically shaped end walls connected by two side walls.

5 27. The assembly of claim 26 wherein the two side walls are planar.

28. The assembly of claim 26 wherein at least one of the side walls is curved.

10 29. The assembly of claim 26 wherein the end walls are at opposite ends of the side walls and blend together with the side walls.

15 30. The assembly of claim 29 wherein at least some of the deformities have a planar surface that intersects the side walls and the end walls in parallel spaced relation to the panel surface.

20 31. The panel assembly of claim 1 wherein the deformities are arranged in clusters across the width and length of the panel surface, at least some of the deformities and each of the clusters having a different size or shape characteristic than other deformities in each of the clusters that collectively produce an average size or shape characteristic of all of the deformities in each of the clusters that varies across the width of the panel surface.

25 32. The assembly of claim 31 wherein at least some of the deformities in each of the clusters have a different depth or height than other deformities in each of the clusters that collectively produce an average depth or height characteristic of all of the deformities in each of the clusters that varies across the width of the panel surface.

30 33. The assembly of claim 31 wherein at least some of the deformities in each of the clusters have at least one sloping surface that has a different slope than the sloping surface of other deformities in each of the clusters that

collectively produce an average slope of the sloping surfaces of all of the deformities in each of the clusters that varies across the width of the panel surface.

5 34. The assembly of claim 31 wherein at least some of the deformities in each of the clusters have at least one sloping surface that has a different angle orientation than the sloping surface of other deformities in each of the clusters that collectively produce an average angular orientation of the sloping surfaces of all of the deformities in each of the clusters that varies across the width of the
10 panel surface.

 35. The panel assembly of claim 31 wherein at least some of the deformities in each of the clusters have a different width than other deformities in each of the clusters across the width of the panel surface that collectively
15 produce an average width characteristic of all of the deformities in each of the clusters that varies across the width of the panel surface.

 36. The assembly of claim 1 wherein the deformities vary in width, depth or height across the width of the panel surface.

20 37. The assembly of claim 36 wherein at least one light source is optically coupled to only a portion of the width of the input edge, and the width, depth or height of the deformities increases as the distance of the deformities from the portion of the input edge to which the light source is optically coupled
25 increases across the width of the panel surface.

 38. The assembly of claim 37 wherein the light source is a light emitting diode.

30 39. The assembly of claim 1 wherein the deformities vary in density across the width of the panel surface.

40. The assembly of claim 39 wherein at least one light source is optically coupled to only a portion of the width of the input edge, and the density of the deformities increases as the distance of the deformities from the portion of the input edge to which the light source is optically coupled increases across the width of the panel surface.

41. The assembly of claim 40 wherein the light source is a light emitting diode.

42. The assembly of claim 1 wherein the panel member is constructed of a flexible material.

43. The assembly of claim 1 wherein the panel member is a film.

44. The assembly of claim 1 wherein the deformities are on or in one side of the panel member, and additional light extracting deformities are on or in another side of the panel member opposite the one side.

45. The assembly of claim 44 wherein the additional deformities are at least one of prismatic, lenticular and V-groove.

46. The assembly of claim 1 wherein at least one light source is optically coupled to only a portion of the width of the input edge, and the deformities vary with the distance of the deformities from the portion of the input edge to which the light source is optically coupled across the width of the panel surface in at least one of the following characteristics: size, shape, placement, index of refraction, density, angle, depth, height, and type.

47. The assembly of claim 46 wherein the light source is a light emitting diode.

48. The assembly of claim 1 wherein at least one light source is optically coupled to at least a portion of the width of the input edge, and the deformities vary with the distance of the deformities from the center of the light source across the panel surface in at least one of the following characteristics: size, shape, placement, index of refraction, density, angle, depth, height, and type.

49. The assembly of claim 1 wherein one light source is optically coupled to the input edge, and the deformities vary with the distance of the deformities from the light source to account for differences in the output of the light source across the panel surface in at least one of the following characteristics: size, shape, placement, index of refraction, density, angle, depth, height, and type.

50. The assembly of claim 1 wherein a plurality of light sources are optically coupled to the input edge, and the deformities vary with the distance of the deformities from light sources to account for differences in the output of the light sources or the spacing between the light sources across the panel surface in at least one of the following characteristics: size, shape, placement, index of refraction, density, angle, depth, height, and type.

51. A light emitting panel assembly comprising a light emitting panel member having at least one input edge, at least one light source optically coupled to at least a portion of the width of the input edge, and a pattern of individual light extracting deformities on or in at least one panel surface of the panel member for producing a desired light output from the panel member, each of the deformities having a length and width substantially smaller than the length and width of the panel surface and also having a well defined shape, at least some of the deformities at different locations on the panel surface having at least one sloping surface that is angled at different angles depending on the location of the deformities on the panel surface to face the portion of the input edge to which the light source is optically coupled.

52. The assembly of claim 51 wherein the light source is a light emitting diode.

53. The assembly of claim 51 wherein the sloping surface of at least some of the deformities is curved.

54. The assembly of claim 51 wherein the sloping surface of at least some of the deformities is planar.

55. The assembly of claim 51 wherein a plurality of light sources are optically coupled to different portions of the width of the input edge, and at least one sloping surface of different ones of at least some of the deformities at different locations across the width of the panel surface are oriented at different angles to face different portions of the input edge to which the different light sources are optically coupled.

56. The assembly of claim 55 wherein the light sources are light emitting diodes.

57. A light emitting panel assembly comprising a light emitting panel member having at least one input edge for receiving light from at least one light source, and a pattern of individual light extracting deformities on or in at least one panel surface of the panel member for producing a desired light output from the panel member, each of the deformities having a length and width substantially smaller than the length and width of the panel surface and also having a well defined shape, at least some of the deformities having at least one side wall and at least one end wall that is rounded, curved or conically shaped.

58. The assembly of claim 57 wherein at least some of the deformities have two rounded, curved or conically shaped end walls connected by two side walls.

59. The assembly of claim 58 wherein the two side walls are planar.

60. The assembly of claim 58 wherein at least one of the side walls is curved.

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61. The assembly of claim 57 wherein at least some of the deformities have only one side wall, the side wall being curved.

10 62. The assembly of claim 57 wherein at least some of the deformities have at least two side walls and at least two rounded end walls at opposite ends of the side walls that blend together with the side walls.

15 63. The assembly of claim 62 wherein at least some of the deformities have a planar surface that intersects the side walls and the end walls in parallel spaced relation to the panel surface.

20 64. A light emitting panel assembly comprising a light emitting panel member having at least one input edge for receiving light from at least one light source, and a pattern of individual light extracting deformities on or in at least one panel surface of the panel member for producing a desired light output from the panel member, each of the deformities having a length and width substantially smaller than the length and width of the panel surface and also having a well defined shape, the deformities being arranged in clusters across the width and length of the panel surface, at least some of the deformities in
25 each of the clusters having a different size or shape characteristic than other deformities in each of the clusters that collectively produce an average size or shape characteristic of all of the deformities in each of the clusters that varies across the width of the panel surface.

30 65. The assembly of claim 64 wherein at least some of the deformities in each of the clusters have a different depth or height than other deformities in each of the clusters that collectively produce an average depth or height

characteristic of all of the deformities in each of the clusters that varies across the width of the panel surface.

5 66. The assembly of claim 64 wherein at least some of the deformities in each of the clusters have at least one sloping surface that has a different slope than the sloping surface of other deformities in each of the clusters that collectively produce an average slope of the sloping surfaces of all of the deformities in each of the clusters that varies across the width of the panel surface.

10 67. The assembly of claim 64 wherein at least some of the deformities in each of the clusters have at least one sloping surface that has a different angle orientation than the sloping surface of other deformities in each of the clusters that collectively produce an average angle orientation of the sloping surfaces of
15 all of the deformities in each of the clusters that varies across the width of the panel surface.

20 68. The assembly of claim 64 wherein at least some of the deformities in each of the clusters have a different width than other deformities in each of the clusters across the width of the panel surface that collectively produce an average width characteristic of all of the deformities in each of the clusters that varies across the width of the panel surface.

25 69. The assembly of claim 64 wherein the size of the deformities in each of the clusters is random.

30 70. The assembly of claim 64 wherein at least some of the deformities in each of the clusters has two or more different shapes.

30 71. The assembly of claim 64 wherein each of the clusters has a random or variable pattern of different size deformities.

72. The assembly of claim 64 wherein at least one light source is optically coupled to only a portion of the width of the input edge, and the deformities in each of the clusters vary with the distance of each of the clusters from the portion of the input edge to which the light source is optically coupled across the width of the panel surface in at least one of the following characteristics: size, shape, placement, index of refraction, density, angle, depth, height and type.

73. The assembly of claim 72 wherein the light source is a light emitting diode.